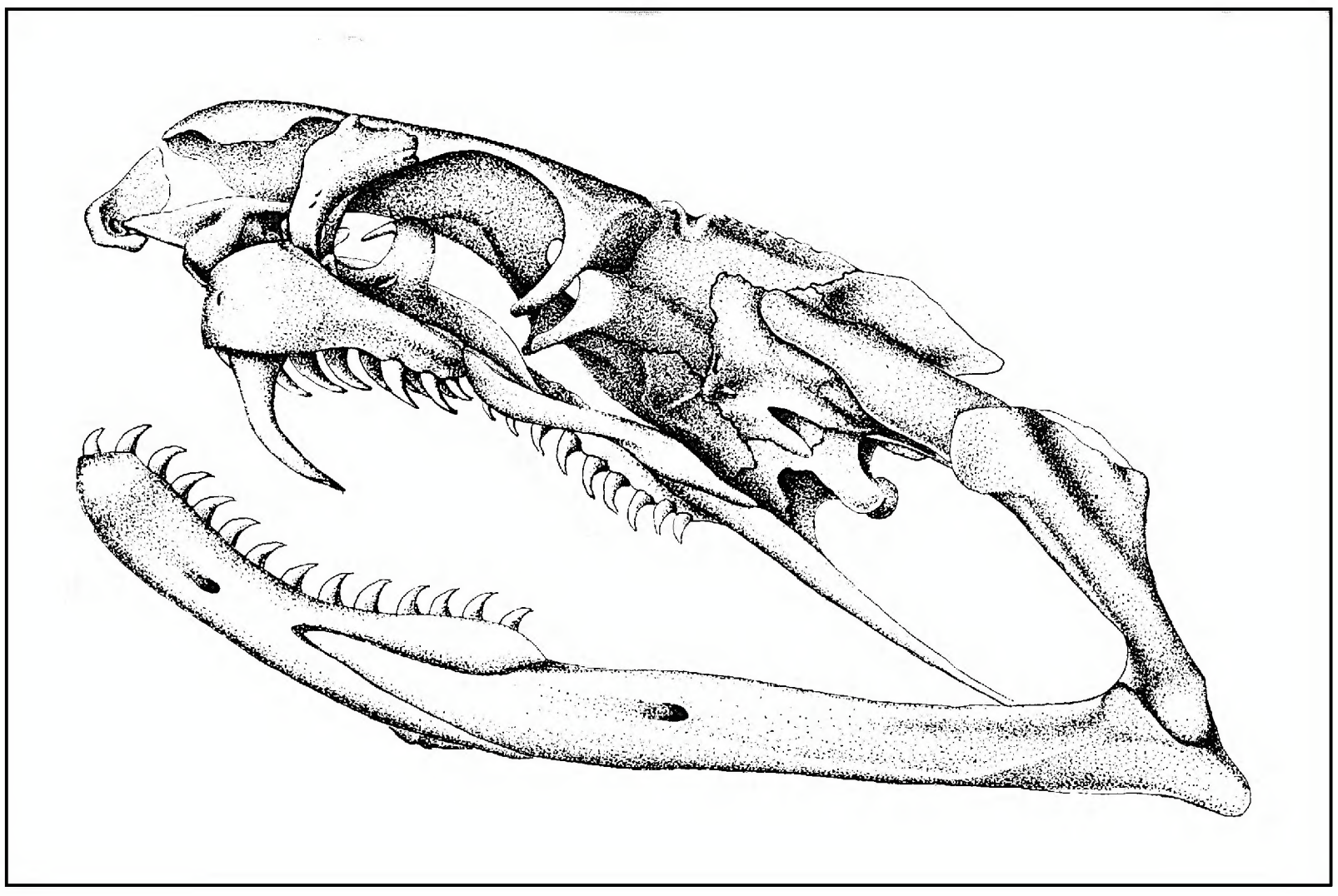
BULLETIN
of the
Chicago Herpetological Society

Volume 42, Number 3
March 2007



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The *Bulletin of the Chicago Herpetological Society* (ISSN 0009-3564) is published monthly by the Chicago Herpetological Society, 2430 N. Cannon Drive, Chicago IL 60614. Periodicals postage paid at Chicago IL. **Postmaster:** Send address changes to: Chicago Herpetological Society, Membership Secretary, 2430 N. Cannon Drive, Chicago IL 60614.

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Bull. Chicago Herp. Soc. 42(3):41-43, 2007

Reproduction of the Atlantic Bushmaster (*Lachesis muta rhombeata*) for the First Time in Captivity

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Introduction

Captive reproduction of *Lachesis muta muta* was achieved in the '80s at the Dallas Zoo (Boyer et al., 1989). Ripa (1994) published an account of the reproduction of the Central American species *Lachesis stenophrys* and *Lachesis melanocephala*. In this paper we present our experience in the reproduction of Atlantic bushmasters in captivity for the first time, involving parental (male and female) DNA from two (maybe three) different couples.

Materials and Methods

It took us five years of environmental education to avoid unnecessary killings and to form the groups (de Souza, 2006). As Ripa (2002) points out about our work: "de Souza's Project *Lachesis* in the Atlantic Forest of Brazil, is a real bushmaster 'farm' where nuisance bushmasters colliding with encroaching development are housed in outdoor enclosures separated only by screen barriers from natural rainforest surrounding them. . . . De Souza has constructed artificial burrows based on paca burrows and the snakes' inhabit these exactly as in nature. The snakes experience the normal rainfall, humidity and temperature gradients typical to the area."

Our first step was to select healthy adults weighing over 4 kg to ensure overall (not only sexual) maturity and good general condition, with some extra energy to spare. All of them were probed, dewormed and received a special diet in the "intensive" system, or individual boxes, prior to their introduction into one of four 2:2 groups, which occurred by the end of August 2006. To reduce and, maybe avoid altogether the possibility of loss of libido or sex drive, a problem already observed in colonies kept in small cages, the animals were communally kept for six months in large enclosures (up to 40 m^2 [430 sq ft]), built indoors in what we call "semi-intensive" system or outdoors in what we call the "extensive" system, both in prime *Lachesis muta rhombeata* territory, the Atlantic rainforest.

In late September 2006, during a series of cold fronts and thunderstorms, two of the four groups displayed indirect signs of sexual activity (male combat): destruction of plants, large water bowls flipped over, uncoiled animals seen "side by side" by one of the keepers. On 14 December, we performed an egg search in these two enclosures and found one clutch in each group, totaling 18 eggs. The fact that some of them could not be separated from their clusters suggests egg-laying a few days prior to the discovery.

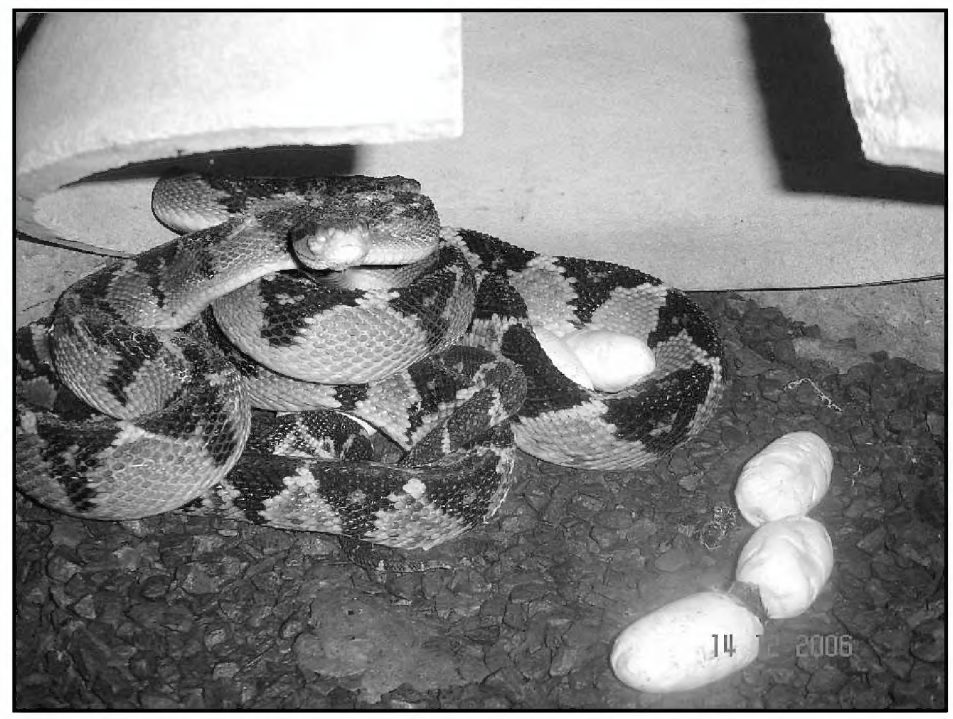
In our region, cold fronts usually occur in September/October, bringing sudden temperature drops and rising humidity levels, a condition that Boyer et al. (1989) showed to trigger hormonal response in female bushmasters. If mating takes

Eggs found in an outdoor enclosure

place during these months, egg-laying will happen in the "dry" season (January through March) when flooding is less likely to occur. In our experience, this apparently logical and evolution-oriented calendar seems to be fiction, and there's no such thing as a "breeding season" for bushmasters in the wild. We recorded actual mating again on 4 January 2007, during an unexpected cold front. Egg-laying should take place some 100 days on, coinciding with the beginning of the wet season.

The "no breeding season" idea is also supported by the fact that in any given 12-month period, we detect no pattern in the size, thus age, of the animals we encounter, which vary from a couple of months old, up to "teens" and young adults.

Based on previous experience, our main concern was to keep insects in general and, particularly, a very small fly (about one-quarter the size of a typical *Drosophila*), endemic in our region, from getting to the eggs. The problem was that,



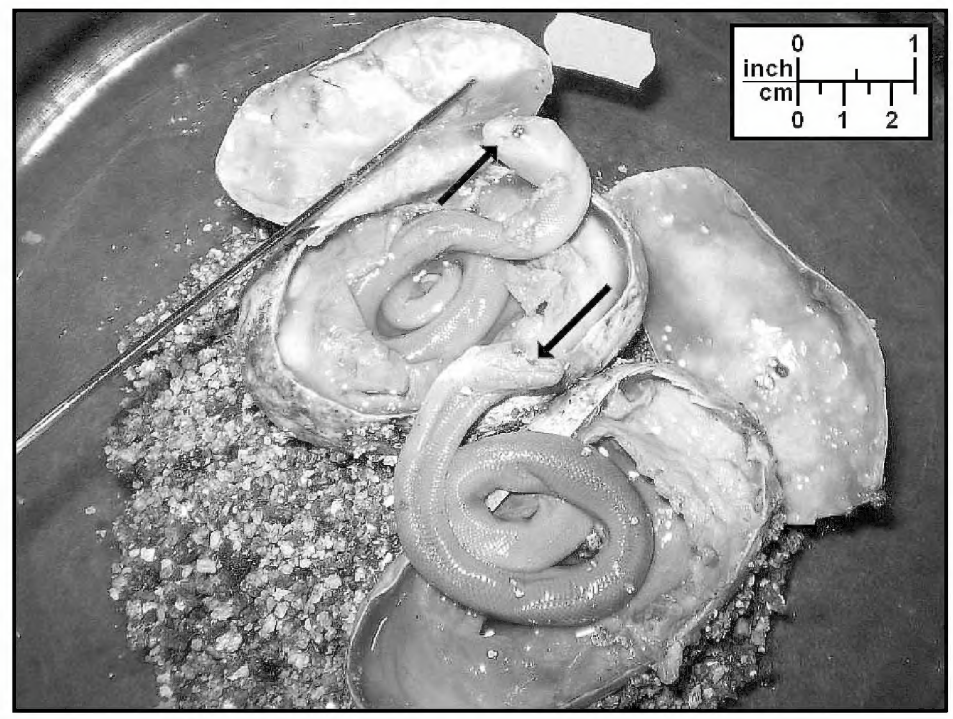
Eggs found in the indoor enclosure

while we had to guarantee that the protection would be tight enough to keep these flies away, normal egg metabolism had to be preserved. Since we had no information regarding gas exchange of the eggs, we decided to conduct a simple experiment to test if our protection scheme (more below) would allow normal metabolism of the eggs. The experiment was based on the reasonable assumption that the metabolic requirement of an egg is less than that of a small gecko (*Hemidactylus mabouia*). We placed a 4" specimen of this gecko under the same conditions as the eggs and were able to keep it alive and well for two weeks without any air renewal. Just to be safe, we decided to ventilate each bowl every third day and inserted insulin needles through the plastic film covering the glass bowls to serve as vents, assuring free gas exchange without compromising the protection against the tiny flies (circle in the picture below).

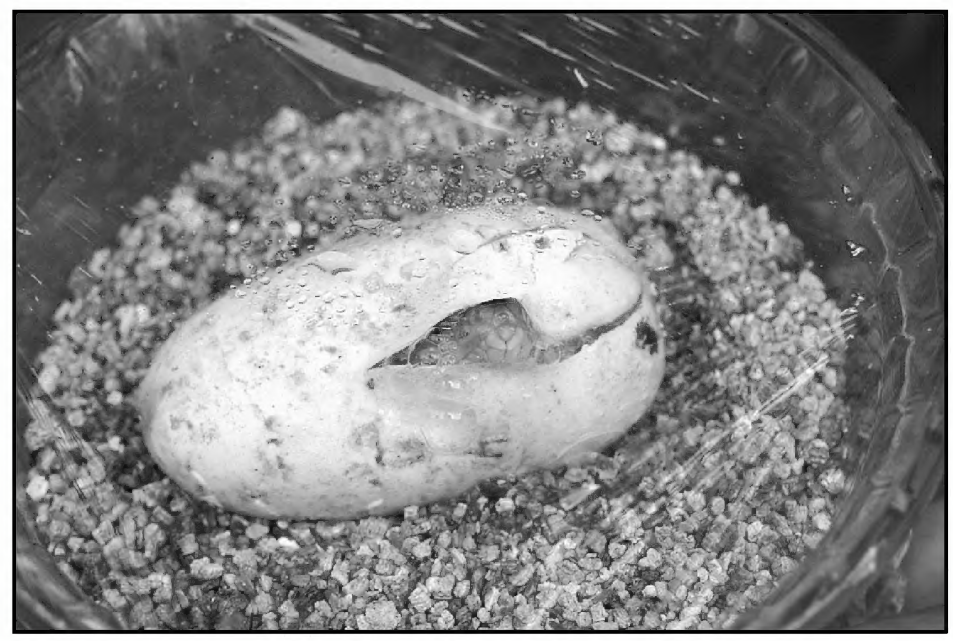
The chosen substrate was vermiculite, mixed 1:1 by weight with sterilized water. This vermiculite was kept in an oven at 300°C (572°F) for 3 hours and vacuum packed until needed, a month later. Fungi were not a problem. Since we are experiencing one of the hottest summers in recorded history, every 10 to 15 days each medium received 10 ml of sterile water (the same normally used in hospitals). The temperature in the Atlantic rainforest, where the vivaria and the eggs were kept, was naturally always between 25 and 28°C (77–82°F) and the humidity levels were always between 80 and 95%.

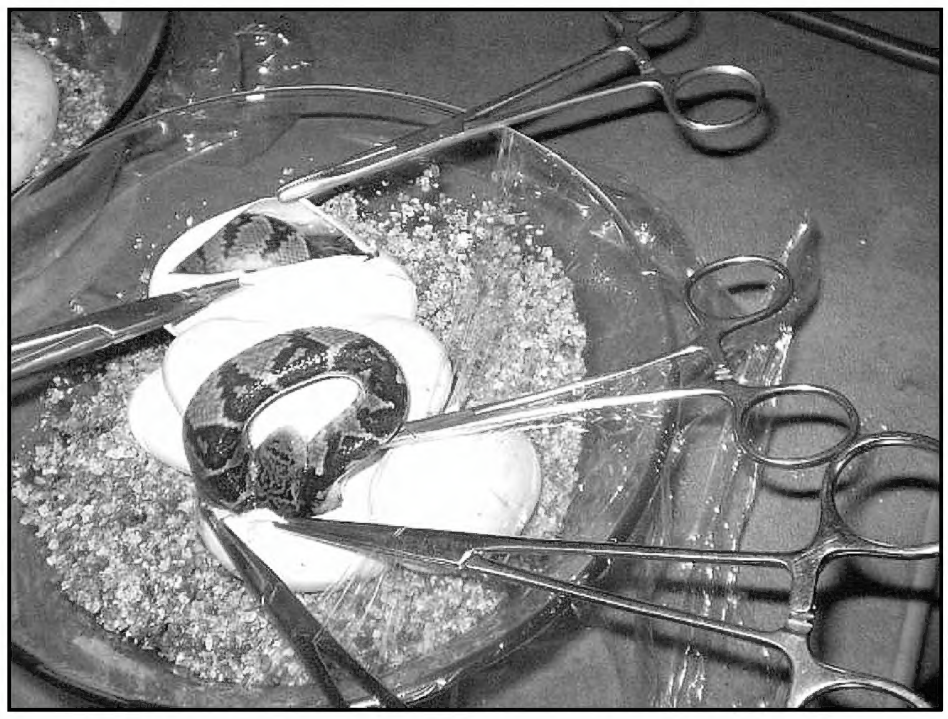
We decided to add some extra protection, an adapted 200-l (53-gallon) aquarium in which we placed the sealed glass bowls with the eggs when we found a rice rat (*Oryzomys* sp, a bushmaster's favorite) in the incubating room. These little guys are known to eat anything, eggs included.

The decision to follow common sense and avoid "placing all eggs in the same basket," dividing them in several bowls, turned out to be very important, because on the 50th day of incubation, one of the handlers in charge of the ventilation of the bowls, left one of them uncovered for 24 hours and, within a few days, the eggs shriveled up. Their shells became leathery and changed color, from white to a greenish yellow. The picture below shows these eggs with a window cut off, allowing us to clearly see the fetuses, with their loreal pits clearly formed already (arrows).



Out of 18 eggs (78–82 g each, 4 samples) from two different groups, one atresic egg was lost in the fourth day, two lost to flies in the 50th day and 15 babies (39–61 g, total length 43–49 cm) are doing fine. Hatching between 74–79 days at 75°F (25.4°C) average under 80–99% humidity levels. We credit the good success ratio to the cool conditions. The Atlantic rainforest, natural *Lachesis* territory, determined these atmospheric parameters; no electricity or technology was involved.





Manipulation of the eggs when they start "pipping" or when the snout starts to protude may lead to a twisting of the umbilical cord and nutritional deficit. Sometimes the neonate will take as long as 5 days to leave the egg and attempts to "help" or even to take good photographs may lead to harmful motion.

Conclusions

Following in the footsteps of Boyer and Ripa, we have achieved an important step towards the preservation of the highly endangered Atlantic bushmaster. Our observations lead us to conclude that there is no such thing as a "breeding season" for bushmasters in the wild. Every cold front is a potential breeding season for these rare, reclusive, demanding and highly specialized snakes, already faced with the destruction of 93% of their Atlantic rainforest habitat. For the second time, we observed apparent male/female guarding of eggs, behavior yet to be confirmed by further observation.

Acknowledgements

We would like to express our gratitude to Paulo de Tarso, YONIC Organization Director for the friendship and finantial support; to Dean Ripa (Cape Fear Serpentarium), Ruston Hartdegen (Dallas Zoo) and Rob Carmichael (Elawa Wildlife Discovery Center) for their guidance and also to João Luis Cardoso, Butantan Institute, for his trust.

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Bull. Chicago Herp. Soc. 42(3):44-47, 2007

Reviews and Commentary:
Lonesome George: The Life and Loves of a Conservation Icon[1] by Henry Nicholls
and
The Pinta Tortoise: Globalization and the Extinction of Island Species[2] by Peter C. H. Pritchard

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" . . . one of the most northerly of the group, so solitary, remote, and blank, it looks like No-Man's Land seen off our northern shore. I doubt whether two human beings ever touched upon that spot. So far as yon Abington Isle [Pinta] is concerned, Adam and his billions of posterity remain uncreated." So wrote Herman Melville (1854, Enchanted Isles, *Putnam's Monthly Magazine*, vol. 3) and Pinta Island, in its remoteness, remains little changed. If only humans had not touched upon that spot what a wonderful place it would be. Old Testament stories tell of the wrath of God; they are matched with effects of Biblical proportions by the wrath of modern man on natural ecosystems. Nowhere has this been more apparent than on islands, even uninhabited ones. The two books reviewed here are about Pinta, and its most famous citizen, a male tortoise, the last of its kind, now living out his days in a compound at the Galapagos Research Station.

While there is considerable overlap in these two publications, and to some extent in the review and comments that follow, their texts and presentation are quite different in scope, as is their intended audience. Like the history and natural history of Lonesome George, Pinta and the Galapagos Islands themselves, the stories are, in a good way, all intertwined.

Lonesome George

If you are interested in tortoises, or concerned with any aspect of conservation there is a lot to be learned from this book. No matter how involved you are in either of these topics this seemingly straightforward publication will provide insights, provoke directional shifts in your thinking, and remind you that for conservation luck comes in both flavors—good and really bad.

This book is well done, well researched, with good analogies, and on-the-mark examples. While the text is focused on Lonesome George and Pinta Island, the author uses a wide array of global examples to explain complex biological concepts and conservation issues. This publication is indexed, has an extensive bibliography, and a chapter--by-chapter account of the sources used in researching the text.

The author, London based Henry Nicholls, writes for a number of the world's leading scientific periodicals, and is editor of the journal *Endeavour*. Dr. Nicholls' degree is in evolutionary biology. Based on the wide array of recent scientific literature he has worked into the text it is clear that Nicholls is not only well read but able to successfully integrate his knowledge into his writing.

This book is about Lonesome George as an icon. A living tortoise whose presence reminds us of the over-exploitations of our forefathers. As the last of his kind George is doomed to a life of solitude, living out his years as a captive, to be viewed by tourists and fed by animal care technicians. He is the last of his genetic line, spending his days in exile from his remote, uninhabited natal island. Actually, all these factors probably disturb us more than they would a tortoise, but this is really the point. The message is sound: being the last one of anything is a depressing thought. Becoming extinct for all eternity is for the Pinta tortoise inevitable. Yet at the same time reminding us as a living icon that we need to learn how to share our space with other species is beyond noble. Of course Lonesome George did not choose his pathetic status as a conservation icon, but his sad message will in the long term help the people of the Galapagos and beyond to understand. This lone tortoise frames the plight of our natural world into both a modern and historic perspective.

In many respects this book builds on Pritchard's publication, the other contribution reviewed here, and expands many of the ideas that grew out of Pritchard's 2003 expedition to Pinta.

Like Pritchard, Nicholls becomes obsessed with the evidence of the dominance of Pinta's male tortoises in the post-whaling era. And while this is indeed an interesting biological aside that allows the author to expand on topics such as temperature-dependent sex determination in reptiles, this is a secondary issue, not the primary one. While it's the duty of scientific minds to cloud issues with facts, and it's the readers joy to wade through all the asides, in the end the message should be clear. In this case I fear that too many readers will be left with the excuse that this was all hopeless anyway as females had become a scarce item by the early 1900s. Yet as we learn from Pritchard's monograph if people had acted in a timely fashion the Pinta tortoises would likely have been saved. Nicholls fails to underscore this message.

This is my only criticism of this work. From my perspec-

1. 2006. 231 pp. Macmillan, London. Hardcover. $24.95

2. 2005. 46 pp. Worldviews for the 21st Century, Vol. 3, No. 2. Orlando and Oviedo, Florida: University of Central Florida, Global Perspectives Office, and Chelonian Research Institute.

tive the author missed the most important point of Pritchard's work (see review below). Yes, while Lonesome George is a true conservation icon, he is also a reminder that if the conservation community got it together in the early 1970s when George the tortoise was first discovered, a thorough search of the island would have yielded additional stock for a captive breeding group. George would not be lonesome, and by now Pinta, free of goats, might be repatriated with breeding age f_1 offspring. While the author makes it clear that his futuristic reproductive science ideas are improbable with today's knowledge, I fear that many readers whose understanding of biology is strongly influenced by TV entertainment will somehow believe that George is an icon of hope.

A significant part of the text addresses the frustrations surrounding the obvious need to somehow reproduce Lonesome George this last of a kind animal. Nicholls manages to wade though some rather graphic sexual issues as they pertain to the reproduction of not just tortoises, but a whole continuum of species. He does this quite directly, but with wording and humor that could not be perceived as disturbing by any but the most puritanical of audiences. Lesser authors would have written around the topic and left readers struggling with trying to understand the complexity of the reproduction issues.

All the information of modern reproductive alternatives presented by the author—sperm storage, artificial insemination, cloning, surrogate eggs, to name a few, seem somewhat ironic when they are suggestions for preserving a creature of such ancient lineage as a giant tortoise. One does not need to read between the lines to see that Nicholls systematically removes one alternative after another from the table for any realistic attempt to create (or recreate) additional Pinta tortoises. Yet, there is now a generation of people who believe that one can salvage damaged DNA from amber-entrapped mosquitoes and make dinosaurs. This, and ideas such as freezing viable sperm, to some offers the unfortunate choice of further putting off today's conservation concerns and dumping mismanagement issues on future generations who will have access to more nifty science toys. Here is a prime example of where a little knowledge of the readers is potentially more harmful than total ignorance. In your dreams science fiction technology will not save the Pinta tortoise from extinction. To the untrained science can be very delusional.

While we are still actually sharing time with Lonesome George, in our hearts we should understand the Pinta tortoises are gone. Somehow his presence both extenuates and denies this simple fact. There are far off stars that we know were extinguished centuries ago yet their light still twinkles in our skies. And like George, the fact that we can still see them somehow masks the bottom line of truth. Light years, extinction, and time are difficult concepts for humans; we are unable to comprehend distances of heavenly bodies, tortoise population genetics, permanence, and the reality of our deeds. Yet the story of Lonesome George is simple, straightforward, and should be understood even by people who are unmoved by loss of rain forest, declining whale stocks, global warming, and similar consequences of human nature. He didn't choose his role as the world's most famous reptile, but most of us can understand Lonesome George's message, even if our futuristic science fantasies allow the finality of the message to become somewhat diluted.

The Pinta Tortoise

Pritchard sets the stage for the sad tale of the Pinta tortoise by first providing a concise overview of the history and natural history of Pinta Island, the northernmost island in the Galapagos archipelago. It is a small island (59.4 km^2) with only modest elevation, leaving its terrestrial fauna especially susceptible to plundering.

The historical account of the island's endemic tortoise (*Geochelone nigra abingdonii*) is sketchy and brief but the information available clearly shows the tortoise suffered both from massive collection by 19th century whalers and from the introduction of feral goats in the mid 20th century. The situation was perhaps worsened by the collection of individual tortoises in the late 1800s and early 1900s for institutions and private collectors. To add to the story there is a little taxonomic confusion resulting from the attempts of British museum curators to evaluate and illustrate specimens. This tortoise was considered to be extinct by the early 1900s and the remote uninhabited Pinta was seldom visited after the last tortoises were removed. In 1971 a single adult male tortoise was found to be living on the island. In '72 he was again located and moved to the tortoise-breeding center at the Darwin Station. Lonesome George can still be seen there today, living out his years with two female Volcan Wolf tortoises. George has shown little interest in his companions, hinting that the taxonomic separation between some of the races of Galapagos tortoises may be products of something now beyond just insular isolation.

After the discovery of the lone male Pinta tortoise came searches for additional specimens. Prior to 2003 Pritchard himself had visited the island searching for both live tortoises and the remains of deceased ones. Pritchard later proposed a systematic search of the island for additional survivors and an expedition was launched in 2003. The expedition is the topic of this publication. This was no small task, the island's terrain is hostile and even large tortoises are not necessarily easily spotted, as they tend to hide under bushes and in concealed places under the lava rocks. The hunt involved over 20 trained people who were all proficient in finding tortoises and hunting goats. The 16-day expedition was a test of endurance: sharp lava rocks, dense vegetation, and the lack of fresh water on the island made safety and daily logistics challenging. Those who have never spent any time on uninhabited, xeric, tropical islands cannot imagine the ordeal of even routine activities. Let's just say there is a reason this island remains uninhabited. Even the landing was difficult as steep lava cliffs dominate most of the Pinta's shoreline. Somehow GIS units and other modern gadgets of convenience don't compensate for the relentless equatorial sun. Pritchard's narrative captures well the nature of camp conditions on Pinta and the hard work and camaraderie of the survey crew.

Pritchard agonizes over the disproportionate number of male Pinta tortoises both in historic records and collections and

in his own findings in the skeletal remains. His explanations for the deficiency of adult females are all reasonable and well thought through. However, a simpler explanation would be the preference of the whaling crews for females. The females are smaller and would be easier to transport across a harsh lava landscape; they moved to the lowlands during the nesting season, and were possible to lower over sea cliffs. The whalers' harvests of live tortoises in the Galapagos lasted from 1790 to 1860 and the bias of adult males on Pinta was already apparent by the late 1800s. We know from other available information survival of Galapagos tortoises well past 100 years is probably not exceptional. Thus, skewed sex ratios biased by whalers selecting female tortoises would still be apparent even into modern times.

While no live tortoises were found, the bones of 16 individual Pinta tortoises were recovered from lava crevices on the island. These remains show the saddle-backed Pinta tortoises to be fragile-shelled creatures with strong limbs. While the adult remains were nearly all of males, the parts of at least one female were identified. Some were mixed with the bones of goats. The results of the 2003 expedition indicate that a small group of adult and subadult tortoises survived in a remote section of the island with particularly harsh terrain up until one or two decades ago. The rugged terrain actually might have benefited the tortoises in their last stronghold, as it may not have been equally suitable for competitive grazing by goats.

What have we learned? Well quite simply the Pinta tortoise is extinct. The fact that Lonesome George is still with us tests the standing definition of the word, but the biological truth is this tortoise is forever lost. The absolute nature of the term extinction is somewhat blurred by George's still-beating heart; perhaps this is good as it will allow time to reflect on the excessive tortoise harvesting by our ancestors and our own inadequacy to make right a bad situation. The fact of extinction becomes harder to swallow as we learn that this particular extinction could have been avoided; action taken even a few decades earlier might have saved this tortoise from eternal oblivion. The weathered bones and the voiceless George have a lot to tell us, and in Dr. Pritchard they have found a good spokesperson.

I have a personal, but somewhat embarrassing stake in all this. My great, great grandfather owned one of the major New Bedford whaling fleets and thus was probably responsible for some of the plundering of Galapagos tortoises. Like Lonesome George I am personally invested in the bleak outcome of all this. How interesting a world if we could have the opportunity to reeducate our forefathers with what we know today. Lonesome George, of course, reigns from a time dating back perhaps only one of his generations, yet we are each connected to an historical event we wish could be corrected. We both would like to make things right, if only we knew how.

The future of the Pinta Island tortoise as we know it is beyond bleak. Pritchard offers some refreshing suggestions for attempting successful captive breeding of George with a more similar race of saddleback tortoise as well as some ideas that may help stimulate the tortoise's interest in females. All are good points, and are much more in the world of reality than the ideas offered by Nicholls. We can only hope that the staff of the Darwin Station will follow Pritchard's suggestions. (When I was at the Station in 2005 there was no indication this was the case.) However, there is also the island itself. The mass exploitation of tortoises by whalers is obviously no longer an issue, and the wildlife of Pinta and the Galapagos in general is now reasonably well protected. Furthermore, the feral goats have all been removed from this island and the native vegetation is well on its way to recovery. Dr. Pritchard's other suggestion is the introduction of one of the other archipelago's tortoise subspecies to Pinta. Large herbivores are now lacking and it seems desirable and logical to return representatives of the keystone species back to the island.

All too often accounts of this type are published in foreign countries, inaccessible journals, and in unfamiliar languages so they remain unavailable to the key audience—the very people who must learn about and understand what has been written concerning their native biota. I was pleased to see that this monograph is simultaneously presented in both English and Spanish and I feel confident that multiple copies have been made available to agencies, conservation organizations, and key individuals in Ecuador and on the islands. The editors and publisher of this contribution are to be congratulated for having foresight to do this.

My only suggestion is that this monograph would probably have benefited from a glossary. Many of the geological terms are not familiar outside the Galapagos, and terms such as "Judas goats" need explanations to those not already familiar with exotic goat extermination methods.

This publication has more to say than the seemingly straightforward documentation of the extinction of the Pinta tortoise. While the outcome of Pritchard's expedition is disheartening it is yet another example the extreme importance in timing for successful conservation efforts. In this particular case if an expedition such as this one was carried out 10–20 years ago or better yet even earlier when the issues of this tortoise's survival were first realized, the Pinta tortoise could have been saved. A parallel situation occurred on Española, but because of early actions the outcome was positive. After tortoise surveys in the '60s and '70s the few remaining adults of the Española population were moved into captivity and successfully bred. Later after exotic competitors were removed and the tortoises' offspring were head-started, the home island was repopulated. Now the repatriated offspring are of adult size. The good news: a wild self-reproducing and growing tortoise population produced from the original stock once again inhabits Española.

Yet throughout the world unresolved conservation problems seem to outweigh successes as agencies and conservation organizations continue to have meetings to discuss issues, to research every aspect of near basket-case species, and then regroup and have follow-up meetings to examine their findings. Let's not forget research grant proposals, calculating overhead, interim reports, extensions and additional funding requests, and final reports. And then once written the published results await the evaluation and review of the researcher's peers. Committees are formed, new acronyms are born and new plans are

discussed. It's all well intended. Timely action is needed and in nearly all cases educated, direct, commonsense approaches are the ones that actually succeed. Individual turtles and tortoises have the advantage of being long-lived and thereby there is some latitude, a buffer of longevity that allows critical situations to continue for decades before the last option for recovery is lost. The story of the Pinta tortoise and Lonesome George is a good example of this, but in this case 150 years of hand wringing with no attempt to remedy the situation proved too long even for a population of tortoises on an uninhabited island.

Remember back in high school, while we suffered through long boring history lessons and we were constantly reminded by our teachers to pay attention. "History is important because we can all learn from the mistakes of our past." How many "Lonesome Georges" and other last-of-their-kind creatures will be bottled-necked into extinction before we actually learn from our past? Someone is not paying attention and it's likely to be a Department of Natural Resources near you.

So what have we really learned, and can Lonesome George become a poster child for driving home the message that extinction is depressing? Even if we just focus on the needs of turtles and tortoises most evidence shows that currently people, agencies, and governments are shortsighted. We shrug in disgust at the mass pillaging of turtles by the Asian food markets, knowing that there's little the average person or our own agencies can do to correct the situation. Yet our own agencies can't grasp the same issue when it's closer to home. For example, Maryland is still permitting the rape of Chesapeake Bay terrapins and promotes a no-limit fishery. And where are the harvested terrapins going? To Asian food markets, of course.

The staffs of agencies responsible for overseeing the well being of rare and declining indigenous species should each be given a copy of Pritchard's work as required reading. Island extinctions can occur at a faster pace than on continents, but now is the time, not to be thinking about the problem, but to be putting into place pro-active conservation initiatives for box turtles, terrapins, gopher tortoises, and all the other species that we allow to be directly, or in the case of the gopher tortoise, indirectly commercially exploited. Will we one day need an expedition to New Hampshire to see if wild populations of Blanding's turtles are still extant there? Or if any three-toed box turtles continue to roam the grasslands of eastern Oklahoma after decades of plundering by reptile dealers who sell them off en masse to PetCo?

The outcome of Pritchard's 2003 expedition was sad and perhaps predictable, but more distressing would be the thought that Lonesome George and a sundry collection of sun-bleached bones don't have something relevant to teach us.

So here is the real test question. How many Georgettes, Grenadines, and Gregorys are there? Individual relicts persisting in solitude and scattered about in our local vacant wood lots, impounded rivers, or partly drained wetlands. Box turtles, map turtles and spotted turtles each living out their time permanently isolated from all others of their kind. They don't have human names, the charisma of a giant tortoise, or the distinction of being the last survivor of their kind. Yet they are individuals wise enough to have avoided years of lawn mowers, road traffic and the afternoon explorations of little boys. In their small worlds they too are the last of their kind. What should be done for these lost souls? And more to the point, what can be done to prevent this from becoming a recurring theme as their world, and ours, continues to be fragmented into smaller, more abused units? Is it not time to begin regarding wildlife as something more than just living objects needing only regulations and management? We are all emphatic with the plight of Lonesome George, but how can we direct his image to instill compassion for our own overlooked backyard wildlife? It's a real question.

Bull. Chicago Herp. Soc. 42(3):47-49, 2007

Notes on the Reproductive Biology of the Rusty Desert Monitor, *Varanus eremius*, the Sand Monitor, *Varanus gouldii,* and the Black-tailed Monitor, *Varanus tristis*, (Squamata: Varanidae) from Western Australia

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Abstract

Histological analyses revealed that males of three Australian varanid lizards from Western Australia, *V. eremius*, *V. gouldii* and *V. tristis*, began producing sperm (entered spermiogenesis) during austral spring and continued into summer. Presence of corpora lutea indicates *V. eremius* ovulates in October and November and *V. gouldii* ovulates in November and December. The reproductive cycles of *V. eremius*, *V. gouldii* and *V. tristis* best fit the Type 1 category of: spring spermatogenesis and mating with spring ovulation of Heatwole and Taylor (1987). This reproductive strategy is common in temperate zone lizards and insures young are born during summer when food is plentiful.

The rusty desert monitor, *Varanus eremius,* occurs in the interior of Australia from far western Queensland through central Australia to the coast of Western Australia; the sand monitor, *Varanus gouldii*, is found throughout most parts of continental Australia and parts of southern New Guinea; the black-tailed monitor, *Varanus tristis*, occurs from the coast to interior of northern Australia to northern New South Wales and southwestern Western Australia (Cogger, 2000). Information on reproduction in these varanids is in Bennett (1998); Ehmann (1992); Pianka (1982, 1986, 1994, 2003, 2004a, b); Thompson (2004). Information on reproduction in *V. gouldii* is also in Shine (1986). This paper summarizes information on the reproductive biology of *V. eremius*, *V. gouldii*, and *V. tristis* from a histological examination of museum specimens collected by Eric R. Pianka in Western Australia during 1966–68.

Gonads from these three species of varanids were examined from the herpetology collection of the Natural History Museum of Los Angeles County, Los Angeles, California (LACM). The samples consisted of 34 *V. eremius* (11 females, mean snout-vent length [SVL] = 131 ± 8.4 mm SD, range = 118–143 mm; 23 males, SVL = 131 ± 14 mm SD, range = 95–155 mm) collected between 26°14' S to 28°30' S and 121°00' E to 123°55' E: LACM 54088, 54089, 54091, 54093-54099, 54102, 54104, 54106-54109, 54111-54113, 54115-54120, 54125-54133; 36 *V. gouldii* (18 females, SVL = 287 ± 28.6 mm SD, range = 245–338 mm; 18 males, SVL = 314 ± 37.8 mm SD, range = 243–415 mm) collected between 19°06' S to 30°15' S and 118°26' E to 130°10' E: LACM 54044, 54046, 54047, 54050, 55388, 55392, 55396-55407, 55409, 55411, 55413-55415, 55417, 55418, 55420, 55421, 55423, 55425, 55426, 55429, 55430, 55432, 55434, 55437, 55438; 17 *V. tristis* (4 females, SVL = 242 ± 19 .1 mm SD, range = 230–270 mm; 13 males, SVL = 238 SVL ± 23.6 mm SD, range = 191–263 mm) collected between 26°14' S to 28°30' S and 120°19' E to 125°50' E: LACM 54056-54058, 54060-54064, 54066-54071, 54073, 55455, 55456.

Gonads were dehydrated in ethanol, embedded in paraffin, sectioned at 5 μm and stained with Harris hematoxylin followed by eosin counterstain. Enlarged ovarian follicles (> 10 mm length) were counted. Male and female mean body sizes (SVL) were compared with an unpaired *t*-test using Instat (vers. 3.0b, Graphpad Software, San Diego, CA).

Varanus eremius — Three stages in the testicular cycle were found: (1) Regression (seminiferous tubules contain spermatogonia and Sertoli cells); (2) Recrudescence (primary and secondary spermtocytes predominate in the seminiferous tubules; some spermatids may be present); (3) Spermiogenesis (sperm clusters line the seminiferous tubules; groups of metamorphosing spermatids are present).

Testes from 23 males were in the following conditions: August (5) 4 in recrudescence, 1 in spermiogenesis; September (6) 6 in spermiogenesis; October (5) 5 in spermiogenesis; November (3) 3 in spermiogenesis; December (3) 3 in spermiogenesis; January (1) 1 in spermiogenesis. The smallest reproductively active males (spermiogenesis in progress) measured 112 mm SVL in (LACM 54094) from October and 113 mm SVL (LACM 54115) from August. The seminiferous tubules were inactive in one apparently subadult male from August (LACM 54113) which measured 95 mm SVL. An unpaired *t*-test showed no significant size difference between *V. eremius* males and females ($P = 0.90$).

Three stages in the ovarian cycle were found: (1) inactive with no yolk deposition; (2) enlarged ovarian follicles (> 5 mm length); (3) corpora lutea present from previous ovulation and no yolk deposition. Ovaries from 11 females were in the following conditions: October (3) 2 with enlarged follicles containing 3 and 4 eggs, respectively, 1 with a corpus luteum; November (2) 1 inactive, 1 with corpus luteum; December (1) 1 inactive; January (3) 2 inactive, 1 with 3 enlarged follicles; February (1) inactive; March (1) 1 inactive. The smallest reproductively active female (three enlarged follicles) measured 118 mm SVL (LACM 54120) and was from January.

Pianka (2004a) reported *V. eremius* mates in the austral spring during October–November. My findings (based on histological analyses), support the observations of Pianka (2004a), as males of *V. eremius* began to produce sperm in August and continued into at least January. Pianka et al. (2004) reported testes regressed during May and June. My data indicate males as small as 112 mm SVL produce sperm, slightly lower than the 116 mm lower limit for mature *V. eremius* males in Pianka (2004a). Females ovulate (corpora lutea present) in October and November. Eggs are laid in November and December (Pianka, 2004a).

Varanus gouldii — Seminiferous tubules from 18 males were in the following conditions: September (4) 3 in recrudescence, 1 in spermiogenesis; October (5) 5 in spermiogenesis; November (4) 4 in spermiogensis; January (5) 2 in spermiogenesis, 3 regressed. The smallest reproductively active male (spermiogenesis in progress) measured 243 mm SVL (LACM 55398) and was from November. *Varanus gouldii* males were significantly larger than females (unpaired *t*-test, $t = 2.4$, $df = 34$, $P = 0.02$).

Ovaries from 18 females were in the following conditions: September (3) 3 inactive; October (3) 3 inactive; November (3) 1 with a corpus luteum, 2 inactive; December (5) 2 with corpora lutea, 2 with enlarged follicles, 5 and 6, respectively, 1 inactive; January (2) 2 inactive; February (2) 2 inactive. The smallest reproductively active female (corpora lutea present), from December, measured 253 mm SVL (LACM 55434).

Males of *V. gouldii* from Western Australia began to produce sperm in September and continued until at least January. Thompson (2004) reported mating occurred in September–November. My findings indicate ovulation (based on presence of corpora lutea) occurs in November and December. Shine (1986) reported oviductal eggs were present in January and February. In view of the extensive range of *V. gouldii*, there is likely geographic variation in the reproductive cycle.

Varanus tristis — Testes from 13 males were all undergoing spermiogenesis: August (2); September (8); October (1); November (1); January (1). The smallest reproductively active male (spermiogenesis in progress) measured 191 mm SVL (LACM 54063) and was from January. Ovaries from 4 females were in the following conditions: September (1) 1 with

enlarged follicles; October (2) 2 inactive; January (1) 1 inactive. The smallest reproductively active female (11 enlarged follicles) measured 233 mm SVL (LACM 54057) and was from September. An unpaired *t*-test showed the size difference between males and females *V. tristis* was not significant ($P = 0.81$).

Males of *V. tristis* produced sperm from August into January. Testes regressed in January–March (Pianka et al., 2004). Pianka (2004b) reported mating occurred in October–November and eggs are laid in October–November. There is substantial geographic variation in the reproductive cycle as mating occurs from early May to late June in the Northern Territory (Pianka, 2004b).

Heatwole and Taylor (1987) summarized the types of reproduction exhibited by Australian reptiles. It appears that *V. eremius*, *V. gouldii* and *V. tristis* best fit the Type I category of: spring spermatogenesis and mating and spring ovulation. This type of cycle insures ovulation will occur during spring and young will be born in summer with sufficient time to acquire fat reserves to last them over winter. It is a common reproductive strategy observed in temperate zone lizards throughout the world.

Acknowledgments

I thank Christine Thacker (LACM) for permission to examiune lizards. Dustin Goto (Whittier College) prepared the histology slides.

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Bull. Chicago Herp. Soc. 42(3):50-51, 2007

The Trials of a Melbourne (Australia) Snakebuster

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Who is more insane? The man who goes out and pays to have a snake for a pet, or the person who pays someone to take a snake away from their property?

I ask myself that all the time. My day job is writing books about corruption in government. Now that's dangerous! Anyway, when I get sick of this real-life danger, I do something far safer. That's go out and capture the supposedly dangerous Australian snakes like taipans, death adders, king browns and the like.

And guess what? The local Victorian wildlife authority have made me one of their licensed snake catchers. That means that when some agitated and desperate person with a snake on their property decides they want to get rid of it, they call me. Yes, I'm in the phone book as "Snakebusters." The name's trademarked. It's also on the worldwide web as snakebusters.net, the lot, and as the only snake-catcher in the Melbourne phone book, I get lots of calls.

Here's the local scene in summary. Melbourne's at the worst end of Australia. Way down south, it's far from all the pythons, death adders and most other really neat snakes one associates with Australia. Melbourne is a cold, wet, and generally miserable muck-hole—too cold for much else other than the hardiest of snakes. But there are a few species tough enough to live here. Mainly tiger snakes (*Notechis scutatus*), copperheads (*Austrelaps superbus*) and eastern brown snakes (*Pseudonaja textilis*), and they can all deliver a potentially fatal bite.

Now although none of these snakes is particularly numerous here, the fact that Melbourne has three million people means that I still get a steady stream of people calling for me to come and get the odd wandering snake. In warmer spring weather, two or three calls a day is routine.

You never know when the calls are going to come in, but there are certain trends. Most snakies will tell you, "When the weather warms up, the snakes move . . . especially in spring," or whatever. Sure there may be truth in this, but I find the following as a better indicator: "Expect a snake call when you are either on the toilet, having sex or out of town."

When the calls come in, you've got to drop everything and get to the scene as fast as you can. You see, you've got to get there before the snake either escapes or ends up being clobbered to death by some mad Rambo. Which brings me to a few memorable recent calls.

The first one was a prank. A lady from Whittlesea rang and said one of her sons had seen a snake in the shed and she wanted me to come and get it. I don't like these calls at the best of times as unless the snake is being watched, it almost becomes like a wild goose chase trying to find a snake that showed itself some time back. Anyway after telling her I charged for the service, I went to the property.

I soon found myself standing in the shed with her son and her daughter. The son told me, "Er, I think it may be under that hat on the ground." As I lifted it, he screamed, "There it is," sending the daughter into a state of screaming and deep panic. The son was laughing of course. Why? He'd planted a rubber snake and the whole scene was a set-up at his sister's expense.

Rubber snakes? Don't laugh! I get a couple of these every summer! People glance at them, run away, phone me and then I "rescue" them.

The next call of note after the one above was a South African woman in the inner suburb of Carlton. This is concrete jungle stuff. Here you'd be lucky to find a lizard, let alone a snake.

Anyway she was really agitated. Her: "You snakebusters?" Me: "Yes." And later, "I've seen it in my compost bin . . . GET THIS THING OUT OF HERE!" It sounded like a case for the exorcist!

Now after you've been in the snakebusting job for a few years you soon realize that the general public have no idea about snakes and how to identify them, so what they tell you in this regard is generally ignored. Here in Australia, if it's black, it's a "black snake"; if it's brown it's a "brown snake"; and if it's big, it's a "king brown snake." No one here seems to know anything else. And yes, it doesn't matter how much explaining you or anyone else does, this level of ignorance seems to remain.

The reality: most "black snakes" in Melbourne are copperheads. Ditto for most of the "brown snakes" I get called for, although lots of these turn out to be tiger snakes as well. And so, as you drive off to your next snake removal job, there's always that sense of anticipation as to what exactly you are going to find. Sure, there are some species more common in some suburbs and so on, but there's always that element of the unknown. This is especially true when you factor in such variables such as escaped pets, which can be almost anything from any part of Australia. And that's the general feeling I had as I raced off to this woman's house.

Being an inner suburb, I was betting my house on it being an escaped pet. Probably a carpet snake (*Morelia* sp.) or similar. We get a couple of these every year.

I got to the house and found an attractive woman in a state of deep shock. Why do so many normal, rational people go ballistic at the sight of something with scales? She said: "It's in that compost bin, over there! I lifted the lid, saw it, and

then I slammed it shut and called you." So far so good. The compost bin seemed completely sealed so there was no way the snake could have gotten out.

I lifted the lid and at a glance saw nothing and so I put it back. I turned to the woman and said, "Er, sorry, there's no snake in here." She was staring at me and the box and said, "There, on the left side, can't you see it?" It turned out she was pointing at three large slugs that were all sitting in a line. She'd glanced at the slugs and in shock slammed the bin shut and called me thinking she'd seen a snake.

She apologized profusely and said, "Oh, you must think I'm a real idiot." I lied and said, "Oh, no, this happens all the time." What was I going to say? "Jees, you are the most stupid cow of a woman I've ever met!"? Sometimes honesty is not the best policy.

And that'd look really good on my wildlife record book that I have to keep for the local bureaucrats. "Went to house in Carlton and found three unidentified slugs." And, "Earlier find, a rubber snake also unidentified, . . . only indicator of species was a 'Made in China' on the belly," with the added note: "'Had a $2.95 price tag on it . . . perhaps smuggled into Australia . . . doubt it'd reproduce or kill native species."

And then the very same week as this mad South African woman with the slugs, I got yet another call from yet another South African woman in a similar state of shock. "My husband and I have seen this one. It's h-u-g-e, got white markings and it's four feet." This call was in the outer suburb of Templestowe, not far from where I live and based on past records it seemed like the genuine article . . . a snake. I got to the house and was directed to where the reptile was hiding.

This one was under a concrete slab holding in place a drainpipe. I looked under the structure with a torch and saw it. The people hadn't lied to me. This one was as thick as my wrist. The only problem it was a blue-tongued skink (*Tiliqua scincoides*). Okay, it also had four feet! As it happens, nearly one in two "snake" jobs I get here in Melbourne are these lizards. People glance at these lizards and mistake them for snakes.

The next day, the phone rang again. I recall the time exactly. I was in bed with my wife. Putting on my clothes I staggered into the car and raced off to nearby Warrandyte. This time I got to the house and got a real live snake! It was a four-foot-long male copperhead (*Austrelaps superbus*). It'd been swimming in the fishpond in search of food. A damn nice specimen.

I've always had a soft spot for copperheads, being a throwback from when I bred numbers of them back in the 1970s. The only problem with this particular snake was that before I got to the snake to catch it, some crazed gardener had clobbered it with a shovel and broken its back.

Ever wondered why there aren't many snakes in Melbourne?

Herpetology 2007

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

DISTRIBUTION OF SOUTH AMERICAN SIDENECKS

F. L Souza [2005, Revista Española de Herpetologia 19:33-46] notes that the Chelidae (side-necked turtles) are the richest and most widespread turtle family in South America with endemic patterns at the species level related to water basins. Based on available literature records, the geographic distribution of the 22 recognized chelid species from South America was examined in relation to water basins and for the 19 Brazilian species also in light of climate and habitat characteristics. Species distribution maps were used to identify species richness in a given area. Parsimony analysis of endemicity was employed to verify the species-areas similarities and relationships among species. For Brazilian species, annual rainfall in each water basin explained 81% of variation in turtle distribution and at a regional scale (country-wide) temperature also influenced distribution. While rainfall had a significant positive relationship with species number in a given area, a negative but non-significant relationship was identified for temperature. Excepting an unresolved clade formed by some northern water basins, well-defined northern-northeastern and central-south groups (based on water basins) as well as biome differentiation give support to a hypothesis of freshwater turtle fauna regionalization. Also, a more general biogeographical pattern is evidenced by those Brazilian species living in open or closed formations. The geographic distribution of Brazilian chelid species apparently reflects patterns of climate and vegetation physiognomies and can be associated with life-history traits such as low vagility. Since some Brazilian chelid species have a distribution encompassing diversity hotspots, the delimitation of endemism areas could be useful in defining conservation priority areas.

SOFTSHELL ABUNDANCE

V. A. Barko and J. T. Briggler [2006, Chelonian Conservation and Biology 5(2):225-231] investigated smooth softshell (*Apalone mutica*) and spiny softshell (*A. spinifera*) turtle abundance, using 6 years of Long Term Resource Monitoring Program turtle bycatch data collected from the middle Mississippi River. Turtles were collected from 5 physical habitats: main channel border, wing dikes, tributary, open side channel, and closed side channel. Females comprised 62% and males 38% of the total catch of smooth softshell turtles. For spiny softshell turtles, females comprised 67% and males 33% of the total catch. Skewed reproductive age structure and sex ratios were seen among and within both species. Smooth and spiny softshell turtle captures were dominated by reproductive individuals (62% and 87%, respectively). Smooth softshells were most abundant in open side channels and main channel borders, whereas spiny softshells were most abundant in tributaries and closed side channels. Smooth softshell abundance was greatest in deep waters with faster water velocity, whereas spiny softshell abundance was greatest in waters with higher visibility and slower water velocity.

DO ENDEMIC SNAKES TEND TO BE SPECIALISTS?

M. Capula et al. [2006, Amphibia-Reptilia 27(4):531-537] note that the snakes of the Mediterranean regions are in general characterized as wide ranging with relatively unspecialized ecological traits (e.g., feeding ecology and diet composition). The few endemic snake species with a narrow range can be of great interest to control whether the relative ecological non-specialization is truly general for Mediterranean snakes or if, on the contrary, those species with a small range are so because of their more specialized ecology. The authors studied the case of the Italian Aesculapian snake, *Zamenis lineatus*, endemic to southern Italy and the island of Sicily, which was for a long time considered merely as a subspecies of the widespread *Zamenis longissimus*. They studied the diet of this species in the wild, and also examined snout-vent length and head length in several museum vouchers in order to highlight the eventual morphometric correlates of diet composition. Results showed: (i) a diet based on small mammals and birds; (ii) an evident ontogenetic shift in diet composition (from ectotherms to endotherms); (iii) a lack of significant intersexual difference in diet composition. In addition, morphometric data revealed no intersexual differences in average snout-vent length or head length. The general implications of these results are discussed, concluding that, based on this study case, *Z. lineatus* feeding ecology was very similar to that of the widespread and ecological generalist *Z. longissimus*, and this is contrary to the hypothesis that endemic, narrowly distributed Mediterranean snakes may be more specialist than their widespread counterparts.

KINGSNAKE HABITAT USE

M. L. Richardson et al. [2006, J. Herpetology 40(4): 423-428] note that the natural history of prairie kingsnakes (*Lampropeltis calligaster calligaster*) is largely unknown because of their secretive nature. Ten adult prairie kingsnakes (six males, four females) were radio-tracked for one complete active season to determine activity patterns and habitat use in an area in Illinois that included forest, grassland, agricultural fields and roads. The active season extended from approximately April to mid-October. Males' home ranges averaged over four times larger than females' and usually included the individual's hibernation site. Males and females had similar activity levels throughout the season, with no differences in frequency of movement or distance traveled per move. Snakes were underground at least 73% of the 574 times they were relocated, suggesting most activity is nocturnal. Collectively, kingsnakes completely avoided agricultural fields and showed a preference for grasslands, but females were strongly associated with grassland edges along roads. This association with roadside edges, and failure of prairie kingsnakes to cross roads, suggests that roads may be barriers to movement—an observation consistent with recent evidence that roads can be barriers to movement, negatively affecting snakes in ways other than via direct mortality.

ECOLOGY OF GUANA ISLAND RACERS

A. Barun et al. [2007, Copeia 2007(1):93-100], from 2001 through 2005, collected and individually marked 219 *Alsophis portoricensis anegadae* from Guana Island, British Virgin Islands, during the months September–October to determine morphometric characters, evaluate incidence of scarring and tail damage, and assess habitat use and activity. Males were longer than females and significantly heavier and heavier per unit length. Sex ratio was almost exactly 1:1 (102 M:104 F). Undamaged tails of males were significantly longer than those of females, but rates of tail damage did not differ by sex. Scarring and tail damage were more abundant posteriorly on the body and tail, and were cumulative, occurring with significantly greater frequency in larger individuals. Most damage was probably attributable to unsuccessful predation attempts by soldier crabs (*Coenobita clypeatus*). Snakes were found in all habitats except an open grassy plain. Activity appeared to be bimodal, with a depression during the heat of the day. Although usually diurnal, three snakes were observed active at night. Most snakes were on the ground, but a small number were in water or climbing on vegetation or human-made structures. Most were in full shade and very few in full sun when first observed. Snakes most frequently were sprawled, rarely coiled, and many were first seen while moving.

CONSERVATION PLANNING FOR WOOD FROGS

R. F. Baldwin et al. [2006, J. Herpetology 40(4):442-453] report that conservation of fauna breeding in vernal pools is challenging given their complex life histories. Many species, including the widespread North American wood frog (*Rana sylvatica*), require both aquatic and terrestrial habitat, yet insufficient information exists about movements between these environments, nor fine-scale selection patterns within them. To inform conservation planning, a radio-telemetry study was conducted of seasonal patterns of wood frog movements and habitat selection in southern Maine. Forty-three frogs were tracked an average of 25.6 days each, April to November 2003. In early spring, wood frogs generally selected damp leaf litter retreats on the margins of breeding pools. Following breeding, frogs selected forested wetlands (9.3% of the landscape) over forested uplands (90.7% of the landscape) in 75.3% of radio locations ($N = 544$). Postbreeding movements from breeding pools to nearby, closed-canopy, forested wetlands ranged from 102– 340 m (median 169 m, $N = 8$) and included stopovers in upland forest floors ranging from one to 17 days (median two days, $N = 7$). Summer refugia were characterized by shady, moist (nonaquatic), and sphagnum-dominated microhabitats. In urbanizing areas, the authors recommend a shift from a core-habitat conservation model to a spatially explicit approach that considers pool-breeding amphibian habitat as a network of migration-connected habitat elements (e.g., breeding pools, upland forest, nearby forested wetlands). In this study, this approach reduced the amount of land potentially requiring protection by > 2/3 from that of core habitat models. With the rapid dissemination of GIS technology, spatially explicit planning for pool-breeding amphibians is increasingly feasible.

RANGE EXPANSION IN AN INTRODUCED GECKO

K. J. Locey and P. A. Stone [2006, J. Herpetology 40(4):526-530] note that exotic species colonize new areas through the processes of jump dispersal, population establishment, and diffusion dispersal. From 1962 through 1997, Mediterranean geckos, *Hemidactylus turcicus*, were intentionally introduced multiple times into a science building on the campus of the University of Central Oklahoma, Edmond, Oklahoma. In 2005, 365 captures of 305 individuals were recorded. The population size was estimated to be 1005 individuals with a density of 478 geckos/ha. The population has dispersed a maximum distance of 200 m from the point of introduction which translates to a maximum rate of diffusion dispersal of 20 m/yr. These results support the hypothesis that range expansion of introduced Mediterranean geckos has occurred because of multiple jump dispersal events, despite slow diffusion dispersal.

PATERNITY PATTERNS IN *PODOCNEMIS EXPANSA*

D. E. Pearse et al. [2006, Chelonian Conservation and Biology 5(2):232-238] used genetic data from 7 microsatellite loci to determine the frequency of multiple paternity in clutches of giant Amazon river turtles, *Podocnemis expansa*, from the Orinoco River in Venezuela. Among hatchlings sampled from 32 clutches, paternity analysis found that a minimum of 10.3% could conclusively be shown to have been sired by more than one male. The authors contrast this result with those from another population of this species, as well as other species of turtles, and discuss the importance of documenting patterns of paternity in different populations of a given species and considering the effects of ecological differences among populations on female mating behavior.

TOKAY GECKO FORAGING BEHAVIOR

A. Aowphol et al. [2006, Amphibia–Reptilia 27(4):491-503] observed the foraging behavior of tokay geckos, *Gekko gecko*, at the visitor complex of the Khao Khiao Open Zoo at the Khao Khiao-Khao Chomphu Wildlife Sanctuary in Chon Buri Province, Thailand. Foraging parameters of *G. gecko* (foraging period, time spent moving, foraging attempts, foraging success, prey size consumed, and foraging distance) did not vary significantly between males, females, and juveniles. Individuals foraged between 18:01 and 09:00 h. Peak emergence time was between 18:01 and 20:00 h. Peak retreat time was between 04:01 and 07:00 h. Major food items included insects of the orders Lepidoptera, Orthoptera, and Coleoptera. Prey sizes of males, females, and juveniles were not significantly different, indicating no prey size selection. This may have been due to low insect availability in the habitat. *Gekko gecko* tended to be a sit-and-wait forager spending most of the time waiting for active prey. However, it sometimes foraged more actively when insect abundance was relatively high. Foraging behavior of males tended to be more variable than females and juveniles. In addition, variation in foraging parameters among individuals was noted. Foraging strategies of *G. gecko* observed in this study are interpreted in the context of optimal foraging theory.

Unofficial Minutes of the CHS Board Meeting, February 16, 2007

Linda Malawy called the meeting to order at 7:31 P.M. Board members Rich Crowley, Cindy Rampacek and Erik Williams were absent.

Officers' Reports

Recording Secretary: Kira Geselowitz read the minutes of the January 19 board meeting. Minor adjustments were made and the minutes were accepted.

Treasurer: The (773) 281-1800 phone number for the CHS has been cancelled but will be forwarded for a while to (312) 409-4456. Andy Malawy has filled out our tax returns. There was a positive net income for January. ReptileFest payments are starting to come in, and so are the expenses. . . .

Membership Secretary: There was a slight increase in membership over the last 2 months; we'll go up a little in January and February.

Vice-president: The April program is still open. Jason will make sure the speakers get posted on the forum. We need to let more organizations know about our speakers to get more advertising around the community. We should also look for more speakers that are members of the society.

Corresponding Secretary: Cindy Rampacek sent an e-mail update. The Milwaukee show went very well and made money for the society. Special thanks to Mike Scott, Rich Crowley, Jenny Vollman, Rob Carmichael, Jim Kranz, Grace Archer, and John Archer for helping out.

Sergeant-at-arms: Attendance was about 54 at the January meeting. There is a tendency to keep chatting when the meeting is being called into session, and board members should set a good example by disciplining themselves at these times.

Committee Reports

Shows:

- Thank-yous to Jenny Vollman, Mike Scott, and Bob and Pam Bavirsha for attending the Springbrook Nature Center show.
- There is a new "swap" starting up in Lake County that is eager to have the CHS involved, with a free table. Jason Hood will look into it.
- March 10–11 will be the Chicago Kid's Expo in Schaumburg. We will be getting free space, courtesy of *Oaklee's Guide*.
- There will be Peggy Notebaert shows on March 10–11.
- There is another Chicagoland Animal Hobbyist Expo on March 17.
- Reptile Rampage will be on Sunday, March 4, 2006.

ReptileFest: PLEASE sign up if you plan on exhibiting. Besides the dedicated ReptileFest committee (Jenny, Steve Sullivan and John Archer), Deb Krohn and John Bailey are helping out a lot. Josh Chernoff suggested advertising in the *Sun-Times* at a special rate he can acquire. Linda wanted to know how the board felt about having the four Illinois venomous snakes as part of the Herps of Illinois exhibit at 'Fest. Various pros and cons were discussed. The topic was tabled until next month's meeting when a decision will be made.

Monthy Raffle: Josh Chernoff pointed out that it's important to have at least one really appealing item and to start selling raffle tickets as early as possible.

General Meetings: Deb Krohn will present in February about Salamander Safari. Steve has slides accessible at the Nature Center for use in the shorts.

Grants: The grants have been decided upon and the checks are in the mail. They were tough decisions as always.

Chicago Wilderness: Our dues were sent out. We would really like to be involved with their exciting new initiative, "No Child Left Indoors."

Old Business

Shedd Aquarium Trip: There was a great turn-out! Thanks again to Jason Hood for planning it. We are very grateful to George Parsons and the lizard keepers at the Shedd as well. Jason's now planning a behind-the-scenes tour at the Lincoln Park Zoo.

Kentucky: Jason's contacting people at the Kentucky Reptile Zoo and the Louisville Zoo for a trip later this year.

New Business

Board meetings: The March meeting will be held at the Malawys' home, there will be no meeting in April, May will be normal, and we will work on planning the rest via e-mail.

Bulletin Expense: Ideas for decreasing the cost of the *Bulletin* were considered, such as fewer issues per year and having it available online instead of sent out to everyone. All in all, it was agreed that there may be other ways in which the society can work on saving money because the *Bulletin* is so important.

Insurance: We have received an invoice from Leonard Franks to renew our policy. Jason Hood moved to pay the invoice for Board of Directors Insurance to be renewed for 12 months. The motion passed unanimously.

Toys: It was suggested that we order more sand-filled reptile toys to sell at ReptileFest because they are very popular.

Round Table

- Linda shared an article about some birds' ability to release excess heat from their rears.
- Craig Ivanyi (civanyi@desertmuseum.org) who works with PARC (Partners in Amphibian and Reptile Conservation) is requesting captivity information on the northern Mexican gartersnake (*Thamnophis eques megalops*) and the narrow-headed gartersnake (*T. rufipunctatus rufipunctatus*). Anyone who has kept these species should contact him.

The meeting was adjourned at 9:54 P.M.

Submitted by Kira Geselowitz

Advertisements

Feeder Roaches: *Blaptica dubia*, all sizes, meaty and nutritious. Free samples to CHS members, or buy a starter colony to make your own. Superior to crickets in every way. This non-flying, slow moving, non-climbing species is very easy to breed and easy for your reptiles to catch. One starter colony of 100+ mixed sizes, $25. If you don't know about roaches as feeders, read up on them; you'll never need to deal with the hassles of crickets again. E-mail: aasagan@msn.com

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. We feed our colony a nutrtionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice starting from: pinks, $.17 each; fuzzies, $.24 each; hoppers, $.30 each; weanling, $.42; adult, $.48. Rats: starting with pinks at $.45 each, to XL at $1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. PO Box 85, Alpine TX 79831. Call **toll-free** at (800) 720-0076 or visit our website: < http://www.themousefactory.com> .

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice availabe: small newborn pinks up to jumbo adults. Prices start at $25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: publications. *Records of the American-Australian Scientific Expedition to Arnhem Land, Vol. 4—Zoology* edited by R. L. Specht, 1964, 533 pp., many b&w plates, mollusks, fish, amphibians and reptiles (36 pp.), birds and mammals, with DJ, hardbound, $95; *Some Common Snakes and Lizards of Australia* by David McPhee, 1966 (1959), 125 pp., many b&w photos, some back pages wrinkled, small, pocket book, softbound, $25; *Additions to the Herpetofauna of Nayarit, Mexico* by Richard Zweifel, American Museum Novitates No. 1953, 1959, 13 pp., softbound, $5; *El Mundo del Zoo* by Marcos Freiberg, 1974, 91 pp., 16 color plates, 64 b&w photos, in Spanish, softbound, $25. Postage and handling $2.50 for orders under $25, free for orders of $25 or more. All books in excellent condition except as noted. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122. E-mail: toursbyturner@aol.com

Herp tours: Adventure trips to **Madagascar**! Journey somewhere truly unique to seek and photograph nature on the world's least-studied mini-continent. For maximum herp fun and discovery, join Bill Love as we go where few people will ever venture in their lives. Let his experience assure a comfortable tour finding the most colorful and bizarre species on the planet! Get all the details at Blue Chameleon Ventures' comprehensive new website: < http://www.bluechameleon.org> , E-mail: bill@bluechameleon.org, or call (239) 728-2390.

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Job opening: Interested in working at the Wildlife Discovery Center? The WDC is currently accepting applications for an opening as a wildlife educator/ animal keeper. The WDC has an extensive herp exhibit that is open to the public and features native and non native species (including venomous). Candidates should have excellent commucation skills, ability to reach audiences of all ages, experience working with students, enthusiastic, extensive knowledge about reptiles (particularly from a conservation standpoint), must possess excellent husbandry skills. This is a part time position (approx. 35 hours/week) and the applicant should be available on Saturdays and some Sundays. Responsibilities will include: teaching after school classes, facilitating our Grass Is Rattling school field trip program, outreach at area camps (animal shows), overseeing a run of approximately 20 herps, and other duties assigned by the curator. Qualifications: B.A. or B.S. degree in biology or related field (or, college degree can be replaced with proven experience at a herp facility . . . must have excellent references). Salary: $10-13/hour depending on qualifications and experience level. Former staff have gone on to full time positions at large zoos and zoological facilities all over the world! For more information, contact Rob Carmichael, Curator, at (847) 615-4388, or, preferably, E-mail at carmichr@cityoflakeforest.com (or at home: robertcarmichael@comcast.net).

Virtual Museum of Natural History at www.curator.org: Free quality information on animals—emphasis on herps—plus expedition reports, book reviews and links to solid information. Always open, always free.

Line ads in this publication are run free for CHS members—$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

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PLEASE!

ReptileFest 2007 is fast approaching!
We need your help!

Our largest fund raiser of the year will NOT be a success unless you get involved.

Bring your animal(s), no matter how common. We need to fill space.

If you don't have animals, bring yourself, particularly Friday and Sunday evenings.

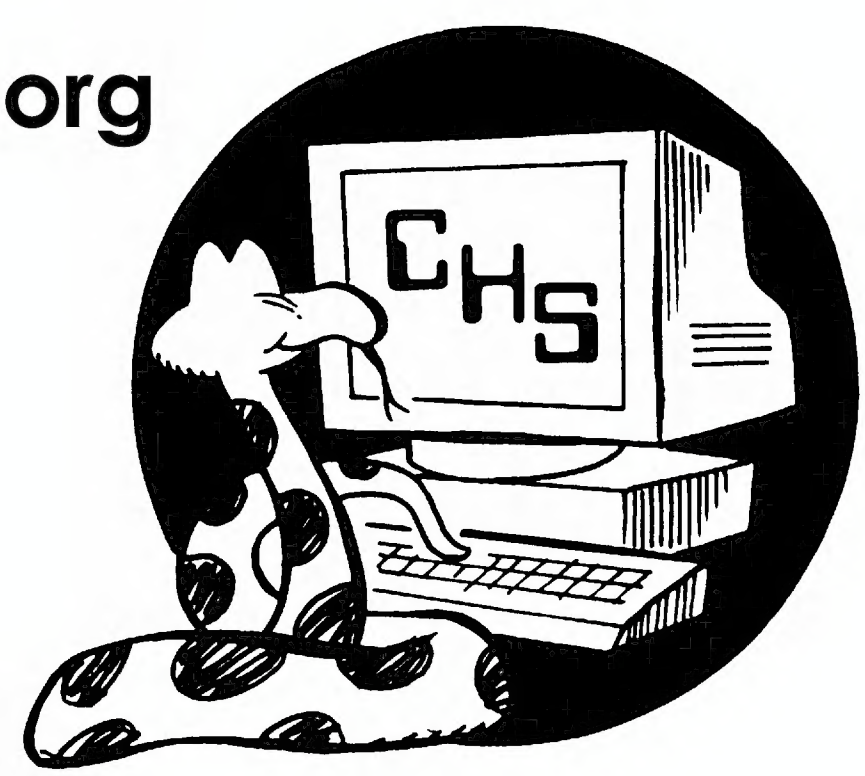
Just come. Exhibit. Work. Have fun. Do good. April 14–15.

Sign up to exhibit at ReptileFest.com or contact Jenny Vollman at (847) 207-3049.

Don't make us come looking for you!

Next time you surf the WorldWide Web, crawl, run, slither, slide, jump, or hop over to the CHS web site!

www.chicagoherp.org



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- **Announcements**
- **CHS animal adoption service**
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- **Much, much more!**

Chicagoherp.org is accepting applications for banner advertisements or links from herpetoculturists and manufacturers of herp-related products. Visit the site and contact the webmaster for details on how you can sponsor CHS!

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, March 28, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **James Harding** of the Michigan State University Museum, will be speaking to the question: "Can the Wood Turtle Survive and Prosper?"

Dr. Carl Gerhardt of the University of Missouri, Columbia, will speak at the April 25 meeting. His topic will be "Vocal Communication in Frogs."

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum — the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

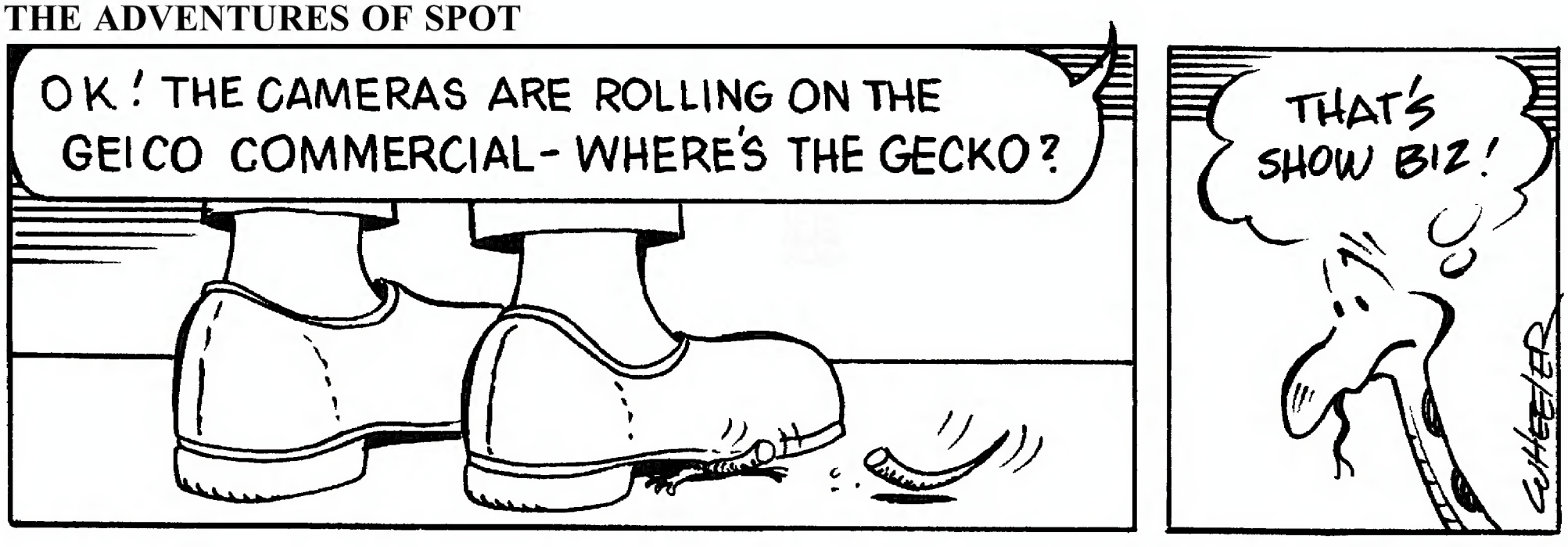
Board of Directors Meeting
Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held May 18 (no April board meeting because of ReptileFest) at the North Park Village Administration Building, 5801 North Pulaski Road, Chicago. To get there take the Edens Expressway, I-94, and exit at Peterson eastbound. Go a mile east to Pulaski, turn right and go south to the first traffic light. Turn left at the light into the North Park Village complex. At the entrance is a stop sign and a guardhouse. When you come to a second stop sign, the administration building is the large building ahead and to your left. There is a free parking lot to the left and behind the building.

The Chicago Turtle Club
The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info call Lisa Koester, (773) 508-0034, or visit the CTC website: http://www.geocities.com/~chicagoturtle.

2007 SALAMANDER SAFARI

This year, the annual CHS Salamander Safari will be held on Saturday, March 24, 10 A.M. – 3 P.M., beginning at the Plum Creek Nature Center at Goodenow Grove Forest Preserve in Will County. Goodenow Grove is south of Crete, Illinois, 1¼ miles east of the intersection of Route 1 and Route 394 on Goodenow Road. If you need directions to get to this area, call Deb Krohn at the nature center, (708) 946-2216. From Plum Creek we will drive to other Forest Preserve District of Will County sites to search for amphibians. Species found or heard calling in previous inventories include spotted salamanders, blue-spotted salamanders, gray treefrogs, spring peepers, chorus frogs, bullfrogs, green frogs, and northern leopard frogs. Species not yet found but possibly occurring (or occurring at preserves nearby) include newts and wood frogs. As in past safaris, CHS members are encouraged to bring interesting amphibians from their personal collections for photography and display purposes. Coffee, juice and donuts will be provided, and a good time will be had by all!

THE ADVENTURES OF SPOT



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